

Ectopic Pregnancy, Active Component, U.S. Armed Forces, 2002-2011

Ectopic pregnancy (EP) is a rare adverse outcome in which a fertilized egg implants and develops outside of the uterus. Life-threatening cases of EP among deployed U.S. service members have been described. During 2002-2011, among active component females younger than 49, 1,245 EPs were diagnosed and treated as indicated by diagnostic and procedure codes recorded in electronic medical records. Annual numbers of EPs ranged from 91 to 151. During the period EP affected 0.64 percent of all pregnancies, with higher proportions among servicewomen in their 30s and of black, non-Hispanic race/ethnicity. As compared with civilians, service members had the same percentage of pregnancies that were ectopic but had lower proportions of EPs that were treated medically (with methotrexate) rather than surgically.

Ectopic pregnancy (EP) refers to the implantation and development of a fertilized egg outside of the uterus, most often in one of the fallopian tubes ("tubal pregnancy"). It is a rare but dangerous adverse pregnancy outcome; the products of conception may grow and eventually rupture the tube, causing severe hemorrhage. Death from EP is rare in developed countries, but life-threatening cases among U.S. servicewomen deployed to Iraq and Afghanistan have been described.^{1,2}

Conditions that impede a fertilized ovum's movement from the ovary through the fallopian tubes to the uterus may place women at risk of EP.³ Such conditions include scarring of the upper reproductive tract as a result of pelvic inflammatory disease, cesarean delivery, tubal and bowel surgery, or prior tubal pregnancy.³ Half of all women diagnosed with EP have no known clinical risk factor.⁴ In the United States, EPs affect higher percentages of pregnancies among women older than 35 and of non-white race/ethnicity.

Proportions of EP in the U.S. increased sharply during the 1970s and 80s, peaked in 1992 at between 1 and 2 percent of pregnancies, and have since remained stable.⁵⁻⁷ The observed increase was partially attributed to an improved ability to detect early EPs that resolved without intervention (i.e., due to tubal abortion or spontaneous reabsorption).⁸

EP can be treated surgically, usually with laparoscopy or laparotomy, or medically with methotrexate injection. Expectant management with close monitoring is an option in some cases.⁹ Although surgical removal of EP is the most common treatment, more conservative management has been advocated to reduce damage to reproductive organs, thereby preserving future fertility.^{10, 11}

This report estimates numbers and proportions of ectopic pregnancy among U.S. military members using methods

described by Hoover and colleagues, who summarized 11,989 EPs in a nationally representative group of insured women.⁷

METHODS

The surveillance period was January 2002 to December 2011. The surveillance population included females aged 18 to 48 years who served in an active component of the U.S. military at any time during the surveillance period.

Ectopic pregnancies were identified by diagnostic and procedure codes recorded during inpatient and outpatient encounters of service members in military and non-military (outsourced care) medical facilities. The administrative case definitions were adapted from those described by Hoover and colleagues, who assumed that a diagnosed EP would be treated. A case of EP was defined as an individual with both a diagnostic code for EP and a procedural code indicating treatment (**Table 1**). This analysis required that the diagnostic and procedure codes be recorded during the same encounter and allowed only one EP per individual per 180 days. The number

TABLE 1. Diagnostic and procedural codes used to define ectopic pregnancy

Diagnostic codes (ICD-9-CM)	
633.x, 761.4	Ectopic pregnancy
Inpatient procedure codes (ICD-9-CM)	
6501, 6509, 6531	Oophorotomy, oophorectomy
6541, 6549	Salpingo-oophorectomy
6601, 6602	Salpingotomy, salpingostomy
6651, 6662, 6669	Salpingectomy
6952	Aspiration, curettage
7430	Ectopic pregnancy removal
9925	Methotrexate injection
Outpatient procedural codes (CPT)	
49320	Diagnostic laparoscopy
58661, 58700, 59120, 59151	Oophorectomy and/or salpingectomy
58673, 58770	Salpingostomy (salpingoneostomy)
58679	Laparoscopy, oviduct, ovary
58720	Salpingo-oophorectomy
59121, 59130, 59135, 59136, 59140, 59150	Other surgical or laproscopic treatment of ectopic pregnancy
90782, 96401, J9250, J9260	Methotrexate injection

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14. ABSTRACT Ectopic pregnancy (EP) is a rare adverse outcome in which a fertilized egg implants and develops outside of the uterus. Life-threatening cases of EP among deployed U.S. service members have been described. During 2002- 2011, among active component females younger than 49, 1,245 EPs were diagnosed and treated as indicated by diagnostic and procedure codes recorded in electronic medical records. Annual numbers of EPs ranged from 91 to 151. During the period EP affected 0.64 percent of all pregnancies, with higher proportions among servicewomen in their 30s and of black, non-Hispanic race/ ethnicity. As compared with civilians, service members had the same percentage of pregnancies that were ectopic but had lower proportions of EPs that were treated medically (with methotrexate) rather than surgically.					
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of individuals who received diagnoses of EP with or without a procedure code (“suspected EP”) was also evaluated.

The proportion of all pregnancies that were ectopic was calculated as the number of treated ectopic pregnancies divided by total number of pregnancies expressed as a percent. Total pregnancies were estimated using ICD-9-CM diagnostic codes for deliveries, miscarriages, abortions and ectopic pregnancies documented during medical encounters of all women in the surveillance population. For the purpose of counting total pregnancies, a birth was allowed every 280 days and other types of pregnancies every 30 days.

RESULTS

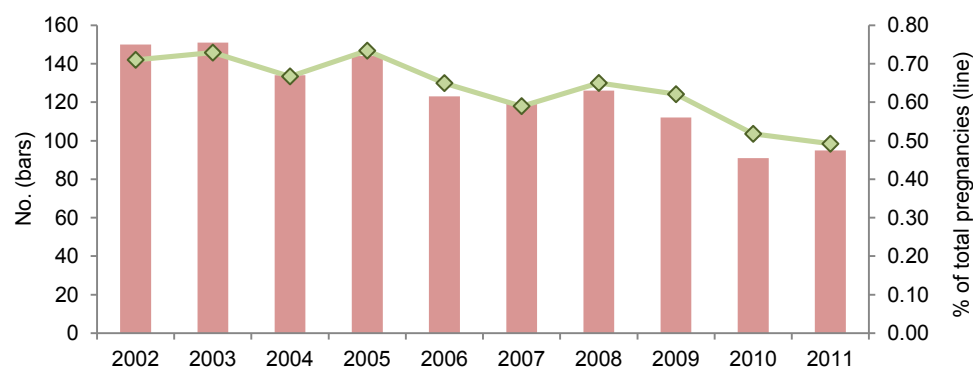
From January 2002 to December 2011, among active component females younger than 49, there were 1,245 cases of treated EP affecting 1,216 individuals (29 women had more than one EP). These EPs comprised 0.64 percent of total pregnancies (n=194,956) during the period (Table 2). Annual numbers

TABLE 2. Percent of all pregnancies diagnosed as ectopic, active component, U.S. Armed Forces, 2002-2011

	No.	% ^a	RR ^b
Total	1,245	0.64	.
Age group			
< 20	50	0.53	ref
20-24	450	0.50	0.94
25-29	375	0.69	1.30
30-34	247	0.93	1.76
35-39	104	0.90	1.70
40 +	19	0.75	1.41
Race/ethnicity			
White, non-Hispanic	497	0.54	ref
Black, non-Hispanic	485	0.85	1.57
Hispanic	155	0.62	1.13
Asian/Pacific Islander	29	0.35	0.63
American Indian	1	0.23	0.42
Other	78	0.60	1.10
Service			
Army	505	0.71	ref
Navy	340	0.68	0.96
Air Force	316	0.55	0.78
Marine Corps	73	0.54	0.77
Coast Guard	11	0.32	0.45

^a% of all pregnancies
^bRatio to referent (ref)

FIGURE 1. Number and proportion of ectopic pregnancies, active component females <49 years of age, U.S. Armed Forces, 2002-2011



of EP ranged from 91 (in 2010) to 151 (in 2003). Proportions were stable at approximately 0.70 percent of pregnancies during 2002 to 2005 and then declined through 2011 to 0.49 percent (Figure 1).

Women with treated EPs comprised 22 percent of all individuals whose records contained diagnoses of EP with or without treatment. Of suspected EPs (n=5,547), two-thirds of hospitalized cases (799/1,198, 67%), but only one-tenth of outpatient cases (446/4,349, 10%) were treated (data not shown).

Proportions of total pregnancies that were ectopic were highest among service-women in their 30s (0.91%), of senior enlisted rank (0.85%) and of black, non-Hispanic race/ethnicity (0.85%). EP proportions were higher in the Army and Navy than the other service branches (Table 2). Approximately 11 percent of cases had had a diagnosis of pelvic inflammatory disease sometime prior to their EP; an additional 11 percent had prior diagnoses of *Chlamydia trachomatis* or *Neisseria gonorrhoeae* infections of the reproductive tract (data not shown).

The proportions of EPs initially treated surgically or medically with methotrexate were 82 and 18 percent, respectively. Annual proportions of surgical versus medical treatment were stable during the 10-year period.

EDITORIAL COMMENT

EP is a relatively rare event, affecting an average of 125 servicewomen per year.

Only 0.64 percent of pregnancies among active component military members were ectopic. This is the exact same proportion reported among civilians during 2002 to 2007 by Hoover and colleagues. Proportions of diagnosed EP have not been increasing among civilians or military members in recent years.

More than one-fifth of EP cases were preceded by either diagnoses of genital infections with chlamydia or gonococci or pelvic inflammatory disease. PID is the one of the strongest independent risk factors for EP, and European studies suggest that preventing PID may reduce EP on a population level.^{3,4,12-14}

Only about 18 percent of ectopic pregnancies among U.S. service members appear to have been treated medically with methotrexate, and this proportion has not changed in at least 10 years. In contrast, the proportions of medically managed EPs among civilians have been increasing. Hoover reported that medically treated EPs as a percentage of all treated EPs increased from 11 to 35 percent during the period 2002 to 2007. In a study of managed care patients in California, medical management increased from 30 percent in 1997 to 39 percent in 2000.⁶ The relatively low proportion of medically treated EPs in the U.S. military may represent an opportunity for achieving future cost savings and improved fertility outcomes following EP.

This analysis of treated EP relied on a highly specific surveillance case definition and should be considered an underestimate of the true incidence of EP among U.S. service members. Only 22 percent of active

component members with a recorded diagnosis of EP also had documentation of treatment; the remaining “suspected” EPs were presumably provisional or “rule-out” diagnoses, though some may have been EPs that were expectantly managed. The proportion of EPs that are expectantly managed in the U.S. is not known. The total number of pregnancies among service-women was also underestimated since elective abortions are not provided within the military health system (MHS) and abortions obtained at service members’ own expense are not documented in records of MHS encounters.

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